CLAIMS:

1. A micro-electromechanical system (MEMS) comprising a substrate incorporating an oscillatory member, forcing means for driving the oscillatory member into resonance, and electrical sensing means providing an electrical output signal dependent on oscillation of the oscillatory member as a result of such forcing and any externally applied force, wherein a positive feedback circuit is provided for feeding back a signal dependent on the output signal of the sensing means to the forcing means in order to sustain oscillation of the oscillatory member.

2. A system according to claim 1, wherein the forcing means comprises n (where $n \geq 2$) forcers for applying forces of substantially equal magnitude to the oscillatory member at points which are distributed at angular intervals of $2\pi/n$ radians around the oscillatory member to preferentially stimulate a flexural mode.

3. A system according to claim 2, wherein the forcing means includes two forcers for applying substantially equal forces to the oscillatory member at two points which are diametrically opposite one another along a first axis of symmetry of the oscillatory member.

4. A system according to claim 3, wherein the two forcers are arranged to apply substantially equal forces to the oscillatory member acting in opposite directions at said points.

5. A system according to claim 2, 3 or 4, wherein the sensing means comprises p sensing elements (where p is an integer ≥ 1) for sensing oscillation of the oscillatory member at p points which are offset by an angular rotation of π/n relative to the forcers.

6. A system according to claim 5, wherein the sensing means comprises a plurality of sensing elements distributed at angular intervals of $2\pi/p$ radians around the oscillatory member.

7. A system according to any preceding claim, wherein the forcing means and/or the sensing means comprises at least one pair of electrodes with each electrode of the pair being provided on a respective side of the oscillatory member and forming a variable capacitance with the oscillatory member, the two electrodes being of substantially the same length.

8. A system according to any preceding claim, wherein the positive feedback circuit incorporates phase shifting means for phase shifting the output signal of the sensing means to provide a feedback signal which sustains oscillation of the oscillatory member.

9. A system according to claim 8, wherein the phase shifting means is adapted to apply a phase shift which is adjustable to maximise the output signal of the sensing means for a given forcing amplitude.

10. A system according to claim 8 or 9, wherein the phase shifting means is adjustable to vary the phase of the signal applied to the forcing means in order to provide fine adjustment of the frequency at which the oscillatory member is caused to oscillate.

11. A system according to any one of claims 1 to 10, wherein the positive feedback circuit does not include any frequency selective components other than the sensing means and the oscillatory member itself.

12. A system according to any one of claims 1 to 10, wherein the positive feedback circuit incorporates filter means for filtering the signal fed back to the forcing means.

13. A system according to claim 12, wherein the filter means incorporates an all-pass filter for introducing a frequency dependent phase shift to sustain oscillation of the oscillatory member.

14. A system according to claim 12 or 13, wherein the filter means incorporates a high-pass filter for attenuating induced noise.

15. A system according to any preceding claim, wherein the oscillatory member is a suspended mass, such as a suspended ring.

16. A system according to any preceding claim, wherein the forcing means incorporates oscillation initiating means for applying an initial impulse to the oscillatory member to initiate oscillation of the oscillatory member.

17. A method according to any preceding claim, wherein the sensing means incorporates a synchronous demodulator for demodulating the sensed signal on the basis of a carrier signal.

18. A micro-electromechanical system (MEMS) comprising a substrate incorporating an oscillatory member, forcing means for driving the oscillatory member into resonance, and electrical sensing means providing an electrical output signal dependent on oscillation of the oscillatory member as a result of such forcing and any externally applied force, wherein the forcing means comprises n (where $n \geq 2$) forcers for applying substantially equal forces to the oscillatory member at points which distributed at angular intervals of $2\pi/n$ radians around the oscillatory member.

19. A system according to claim 18, wherein the forcing means comprises two forcers arranged to apply substantially equal forces to the oscillatory member at points along a first axis of symmetry of the oscillatory member.

20. A system according to claim 19, wherein the sensing means comprises two sensing elements for sensing oscillation of the oscillatory member at two points which are diametrically opposite one another along a second axis of symmetry of the oscillatory member substantially perpendicular to the first axis of symmetry.

21 A system according to any preceding claim, where the oscillatory member supports two orthogonal resonant modes of substantially equal frequencies such that any coupling between modes is mechanically amplified.

22. A system according tò any preceding claim, which is a self-resonant oscillatory ring gyrometer.

23. A system according to any preceding claim, wherein the oscillatory member is dimensioned such that it has two orthogonal modes of vibration that are closely matched in frequency.

24. A system according to any preceding claim, wherein the forcing means is used in a closed loop feedback system to suppress a flexural mode of the oscillatory member.